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Original Article

Adaptation of Questionnaire Measuring Working Conditions and Health Problems Among Iranian Nursing Personnel

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SUMMARY

Purpose: To adapt a questionnaire in the Persian language measuring working conditions and health problems among nursing personnel. A further aim was to test the validity and reliability of the questionnaire.

Methods: The adapted questionnaire was based on three well-established questionnaires. Physical working conditions items were from Nurse Early Exit Study. Psychosocial working conditions scales were included from Copenhagen Psychosocial Questionnaire which contains two scales on general and mental health as well. The Nordic Musculoskeletal Questionnaire was the origin of the musculoskeletal disorders questions. During the culture adaptation process, an expert panel method was used. To achieve equivalence between the sources and target version, some changes were made by the expert panel. Then the questionnaire was examined in the field for face validity and construct validity ($n = 92$) among Iranian nursing personnel from two hospitals. Construct validity was assessed using a priori hypothesized correlations of the outcomes with exposures. Finally the adaptation process was completed by reliability assessment using Cronbach's alpha and Intra-class Correlation Coefficient (ICC).

Results: The construct validity result was the correlation of the health outcome with the work-related exposure (physical $r_s = .71$ and psychosocial $r_s = .66$). In the reliability assessment, Cronbach's alpha and ICC were .60 and .70 respectively.

Conclusion: The findings show that the adapted questionnaire has an acceptable conceptual structure and provides reliable information from the nursing profession. Consequently, the questionnaire is applicable to work situation studies among nurses and other health care workers.

Introduction

Nursing is often a stressful occupation that involves substantial demands and in many cases insufficient resources, which are the risk factors for exhaustion, burnout and poor health (Josephson, Lindberg, Voss, Alfredsson, & Vingard, 2008). Musculoskeletal disorders are the most common work-related health problem, causing disability pension, long-term sick leave and occupational disorders (Lagerstrom, Wenemark, Hagberg, & Wigaeus Hjelm, 1996; Punnett, et al., 2005). Nursing has higher rates of musculoskeletal disorders than most other professions. Consequently, nursing is seen as a risky setting for musculoskeletal disorders in many countries (Choobineh, Rajaeefard, & Neghab, 2006; Gunnarsdottir, Rafnsdottir, Helgadottir, & Tomasson, 2003; Trinkoff, Lipscomb, Geiger-Brown, Storr, & Brady, 2003).

There are different methods for measuring work-related health and the prevalence of musculoskeletal disorders. However, in epidemiological work-related health studies the most common method is the use of questionnaires to measure self-report symptoms. Variations in prevalence of work-related disorders may be a result of different methodologies used for data collection, as well as different questionnaires used for measuring disorders (Alipour,

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Ghaffari, Jensen, Shariati, & Vingard, 2007). Studies of exposures using questionnaires to assess physical and psychosocial working conditions among employees in different fields and occupations can also help us understand the prevalence and severity of musculoskeletal disorders, and stress-related health problems. Factors to be estimated by questionnaires are work-related physical, psychosocial and organizational exposures, as well as personal and lifestyle factors which may contribute to health problems. There is no "golden standard" measurement tool for estimating work-related exposures; however, many studies strive to assess working conditions and work environment among different job groups.

To our knowledge, little is known about work-related physical and psychosocial exposures and work-related health outcomes among nursing personnel, especially in developing countries such as Iran. Thus, there is a need for a questionnaire in the Persian language to measure and assess these factors in the Iranian context. When translating a questionnaire into a new language a rigorous method must be followed. The questionnaire has to be translated into the new language, adapted to the culture of the country and tested for validity and reliability. Accordingly, the aim of this study was to develop a questionnaire in the Persian language, in order to assess personal factors, working conditions and health problems among nursing personnel. A further aim was to test the reliability and validity of the questionnaire.

Theoretical framework

The focus of this study is the adaptation of a questionnaire to evaluate work-related exposures and ill health outcomes in nursing personnel. Due to the nature of healthcare work, all work demands including quantitative demands and emotional demands are prevalent in this sector. Client-related work characteristics (such as emotional demands) are regarded as very important psychosocial stressors, especially in the area of human service work, for example healthcare or nursing work (Rugulies, et al., 2004; Van Vegchel, De Jonge, Meijer, & Hamers, 2001).

Some studies conducted on nursing have stated that psychosocial work characteristics, including effort, reward, overcommitment (based on Effort-Reward Imbalance model by Seigrist, 1996), job demands and influence at work (based on Demand-Control model by Theorel & Karasek, 1996), are the major cause of nurses' intentions to leave the profession. However, other psychosocial work characteristics, including emotional demands, meaning of work, leadership and job satisfaction, are not assessed (Gillen et al., 2007; Hasselhorn et al., 2008; Li et al., 2010;). An overview assessment by Kompier (2003) concerning seven well-established theories on psychosocial work factors, indicated that these theories cover most of the current psychosocial characteristics at work; all of these are also included in the Copenhagen Psychosocial Questionnaire (COPSOQ) questionnaire (Kristensen, Hannerz, Hogh, & Borg, 2005). We believe that the COPSOQ questionnaire is a comprehensive instrument for measuring work-related psychosocial concepts in this study; therefore, COPSOQ and related theories are used as the theoretical framework for this study.

Methods

Design

This study used a methodological research design to adapt a questionnaire in the Persian language measuring working conditions and health problems among Iranian nursing personnel and a survey research design to test the validity and reliability of the questionnaire.

Selected instrument

The selected questionnaire contained three domains: personal factors, working conditions, and health problems.

Personal factors

These data consisted of three different variables concerning sociodemographic information, family situation and lifestyle. Sociodemographic information included items on sex, age, marital status, education, job title, work experience, job position, ward, work shift, working hours and economic status. Family situation included items on children living at home, having enough time for child care, caring for a sick dependent relative and family participation in household activities. These items were adapted from the Nurse Early Exit Study (NEXT) questionnaire. The NEXT study was conducted in 10 European countries, and was based on data from nurses regarding central aspects of their work environment, individual resources and patterns of premature departure from the profession (Hasselhorn, Mueller, & Tackenberg, 2003, 2005).

Lifestyle questions, including items on basal metabolism rate, spare time, regular exercise and smoking, were selected from the Persian version of Musculoskeletal Intervention Center, a questionnaire that has been used to investigate health and risk factors for musculoskeletal disorders among 7,000 nursing personnel in different municipalities in Sweden. Its validity and reliability have been tested in the general working population in Sweden (Vingard et al., 2000; Waldenstrom et al., 2002). Further an adaptation study of the questionnaire had been conducted in the Persian language (Alipour et al., 2007).

Working conditions

This domain contains two parts: physical and psychosocial working conditions. Three physical items to quantify specific heavy lifting, bending/uncomfortable posture and prolonged standing position within the nursing profession were taken from the NEXT questionnaire. The scale was a four-point rating scale, with scores ranging from 1 to 4, where higher scores indicated higher exposure. The final score for each participant was then computed to obtain a rating between 0 and 100[1] (Camerino et al., 2008).

Items on psychosocial working conditions were from the COPSOQ-I. The COPSOQ-I questionnaire, which has been developed in 1997 as a valid and reliable comprehensive tool for assessing psychosocial work environment factors (Kristensen et al., 2005), is available in English and has been translated into many languages (Kristensen, 2010). The selected scales were from the medium-length version of the COPSOQ-I questionnaire, including 11 subscales (for a total of 40 items, the number of items for each subscale is shown in Table 4): quantitative demands, emotional demands, influence at work, meaning of work, role clarity, quality of leadership, sense of community, insecurity at work, job satisfaction and two scales for measuring general health and mental health (Kristensen et al., 2005). The origin of the general health and mental health scales are from the Short Form-36 (SF-36) questionnaire (Ware, Snow, Kosinski, & Gandek, 1993).

The COPSOQ scale value is formed by adding the points of individual questions and giving equal weight to each question. The questions have five response options and the weights are 0, 25, 50,

[1] The final score for each individual was computed according to this formula: (mean score of the physical items × 5)/4 × 20 in order to obtain a final rating between 0 and 100.

75, and 100. Each scale value is then calculated as the simple average, and all scales range from 0 to 100. Respondents who answer fewer than half of the questions on a subscale are regarded as missing. If a person has answered at least half of the questions, the scale or subscale value is calculated as the average of the questions answered by the same individual. Both physical and psychosocial scales were available in English and were translated into Persian in this study.

Health problems

This domain contains two instruments: general and mental health scales (7 items), and the Nordic Musculoskeletal Questionnaire (NMQ) (27 items). As mentioned earlier, the general health and mental health scales are from SF-36. These scales were used to measure the health status of participants, and the scale values were calculated in the same way as for the COPSOQ. The validation process of the SF-36 questionnaire has been studied in a population-based assessment in the Persian language (Montazeri, Goshtasebi, Vahdaninia & Gandek, 2005).

NMQ is a dichotomous questionnaire that measures problems (aches, pain and discomfort) experienced in nine anatomical regions (neck, shoulder, elbows, wrists/hands, upper back, low back, hips/thighs, knees, ankles/feet) during the past 12 months and during the past week. It was developed by Kuorinka et al. (1987), and has been used in numerous European studies (Kuorinka et al.). NMQ has been translated into the Persian language elsewhere (Choobineh, Lahmi, Shahnavaz, Khani-Jazani, & Hosseini, 2004).

Translation process

The translation process of the questionnaire into Persian, including two forward translations and two back translations each by two bilingual translators, followed the guidelines in the literature (Beaton, Bombardier, Guillemin, & Ferraz, 2000; Switzer, Wisniewski, Belle, Dew, & Schultz, 1999). The different steps of the adaptation process for the study questionnaire are shown in Table 1. In the first step, an expert panel method was used. The expert panel consisted of two groups: one expert group in Sweden and another expert group in Iran, from different relevant fields and specialities. There were four members in the expert group in Sweden: two Swedish researchers in the field of occupational health in healthcare workers (PhDs, faculty members), one Iranian researcher in the field of occupational health (MD and PhD), and one Iranian research nurse (MSc and PhD student). The main decisions of this expert group concerned selecting relevant questionnaires to construct a shortened instrument while maintaining good measurement properties. The aim of the second step was to translate the questionnaire into the Persian language, and to strive for idiomatic rather than word-for-word translation. The second expert group were five persons, while two Iranian members of the first expert group were also members of the second expert group. The other members of this group were: one research nurse and one lecturer (PhD and faculty member) and one doctor of occupational medicine (MD and faculty member).

Table 1
Different Steps of the Adaptation Process.

	Performance	Performer
Step 1	Selection of the questionnaire content	First expert panel
Step 2	Translation into Persian, back translations into English	Second expert panel
Step 3	Confirmation of the translation process	Second expert panel
Step 4	Validity (content validity, face validity, construct validity)	Second expert panel and nursing lecturers, nursing personnel supervised by second expert panel
Step 5	Reliability (internal consistency and stability)	Nursing personnel, supervised by second expert panel
Step 6	Final Persian version of the questionnaire	Second expert panel

Cultural and vocabulary adaptations were agreed on in a consensus meeting of the translators and the second expert panel (Steps 2 and 3, Table 1), by modifying some words, e.g. changing "partner" to "spouse", and using "family and close relatives" instead of "family". In Iran, the meaning of "family" differs from that of Western societies, and refers to an extended family rather than a nuclear family. This means that commitment to the extended family is the social norm in Iran (Lagerstrom, Josephson, Arsalani, & Fallahi-Khoshknab, 2010; O'Shea, 2003). In step three, the questionnaire was back-translated into English. The second expert panel confirmed the translated and back-translated versions and reached a consensus on any discrepancy through continuous contact with the Sweden expert panel. Thus, the main decisions of experts concerned cultural and vocabulary adaptations. Finally, the Persian version of the questionnaire was prepared for work on its validity and reliability.

Participants

Thirty voluntary hospital nursing personnel from two general hospitals in Tehran, the capital of Iran were recruited for face validity. To test the adapted questionnaire, 92 nurses were recruited for the study participants via convenience sampling. They were full-time nurses who have more than 1 year of work experience.

Data collection procedure

For face validity each participant completed the questionnaire, which included an information sheet on the first page and an open question on the last page for the respondents to fill in their own comments. After this they were all interviewed to further investigate what respondents thought was meant by each item and the response. The interviewer was the same person for all participants (first author). The main objective of the interviews was to find out whether the participants understood the concept of the questions and to make sure that they had the same understanding of them as the investigators. After this, the second expert panel reviewed the completed questionnaires and the interview findings and reached a consensus in modifying the questionnaire. Finally the questionnaire was used for construct validity and reliability assessment among main participants ($n = 92$). For stability assessment test-retest was performed among half of the main participants. Of those who were invited to participate in the retest (T2), 42 participants completed the questionnaires after a 3-week interval under similar conditions.

Data analysis

Data were analyzed to test validity and reliability of the adapted questionnaire.

Validity and reliability assessments

The content validity index (CVI) for questionnaire scales was completed by the second expert panel together with four nursing lecturers from two nursing faculties in Tehran (a total of 9 experts).

The relevance, clarity and simplicity of each item were evaluated using the CVI score. A score of .80 and higher was considered to be acceptable content validity (Polit & Beck, 2008). Face validity was carried out with 30 voluntary participants.

Construct validity was tested with a convenience sample ($n = 92$) among nursing personnel,hypotheses about the relation of constructs of the study were supported by the presence of an acceptable correlation of the physical and psychosocial working conditions scores as the exposure items, with the general health and mental health scores as the outcome. These hypotheses were used to assess construct validity (Switzer et al., 1999). Spearman's rank correlation coefficient (r_s) was used to assess construct validity.

For reliability assessment internal consistency was tested from the response data of the construct validity subjects ($n = 92$), using Cronbach's alpha to estimate the correlations between items on scales and Kurder-Richardson-20 among dichotomous items. Further, in order to test the stability of the questionnaire, test-retest assessment was performed with the intra-class correlation coefficient (ICC) test for rating scales and kappa test for dichotomous answers (Switzer et al., 1999).

Ethical considerations

The research proposal was approved by the Ethics Committee of the Ministry of Health and the University of Social Welfare and Rehabilitation in Tehran. Permission was granted from the managers and nursing administrators of the study hospitals. Further, permission and written consent have been obtained from all participants and they were given information about the aim of the study. Before filling in the questionnaires, all participants were informed that participation was anonymous, and that they could terminate their participation at any time during the study.

Results

Participant characteristics

The sociodemographic characteristics of the participants are shown in Table 2.

The main professional group was registered nurses (75%), followed by auxiliary nurses and technicians (16.3%), and aids (8.7%). Females accounted for 75% of all participants and males for 25%. Most of the participants had circulatory shifts, and mainly worked more than 44 hours per week.

Validity

Content and face validity

To achieve equivalence between the sources and the target version, some changes were made by the second expert panel. To adapt the physical working conditions in the questionnaire regarding lack of lifting devices in the hospitals, the items about lifting devices were omitted, and a question concerning accessibility of patient transferring devices was added. The second expert panel modified the demographic items within the context, adding items concerning accommodation, commuting time between home and workplace and spouse's job to the questionnaire.

The average of the CVI scores for the questionnaire subscales was 87.2%. The results of the face validity assessment and interviews served to improve the language and fluency of the questions.

Table 2
Sociodemographic Characteristics of Participants ($N = 92$).

Variables	*n*(%)
Sex	
Male	23 (25.0)
Female	69 (75.0)
Age (yr)	
<30	14 (15.6)
30–39	37 (41.1)
≥40	39 (43.2)
Marital status	
Married	74 (80.4)
Unmarried	18 (19.6)
Job title	
Registered nurse	69 (75.9)
Auxiliary nurse & technician	15 (16.3)
Aids	8 (8.7)
Work experience	
1–10	31 (33.7)
11–20	40 (43.5)
21–30	21 (22.8)
Working shift	
Morning shift	14 (15.6)
Night shift	6 (6.6)
Circulatory shift	71 (78.8)
Working (hr/wk)	
≤44[a]	35 (41.7)
45–64	33 (39.3)
≥64	16 (19.0)

[a]Ordinary working hours.

Construct validity

Hypotheses about the relation of constructs in the study were supported in that there was an acceptable correlation between the items on general and mental health and the items on work-related exposures (physical $r_s = .71$ and psychosocial $r_s = .66$).

Reliability

As questions about sociodemographic characteristics were considered as facts and consistent over time, reliability was not assessed. Table 3 shows the results of the reliability assessment. Cronbach's alpha levels were at .61 or more for all scales, and levels of the ICC were at .71 or more. Both Cronbach's alpha and the ICC were thus equal to or greater than .60, and .70 was considered acceptable. The alpha levels for the COPSOQ-I questionnaire and the number of items in each subscale for this study, and for a similar study to validate the Chinese version of the COPSOQ-I (Shang, Liu, Fan, Gu, & Li, 2008), are shown in Table 4. The proportion of missing values for the scales was between 1.1% and 4.4%.

Discussion

The results showed that the Persian version of the questionnaire has a good conceptual structure and provides reliable information on workplace factors. There are many pitfalls in questionnaire adaptation. In addition to difficulties in formulating questions to obtain dependable information about the issues under study, the other main goal is the construction of a shortened instrument while maintaining good measurement properties. A shortened instrument could increase response rate and provide cost-benefit consideration as well (Nubling, Stobel, Hasselhorn, Michaelis, & Hofmann, 2006; Sandsjo et al., 2006). The intention of this study was to construct an instrument that was as short as possible while still maintaining good quality. We conducted a six-step process to

Table 3
Reliability Assessment for Scales of the Study Questionnaire.

Scales of the questionnaire	Level of Cronbach's alpha (no. of items)	Range/average of ICC or kappa coefficient
Working conditions:		
Physical and ergonomic scale	.88 (3)	0.81–0.92/0.85
Psychosocial scales (COPSOQ-I):		
Quantitative demands	.74 (4)	0.82–0.88/0.85
Emotional demands	.79 (3)	0.79–0.94/0.88
Influence at work	.75 (4)	0.71–0.85/0.79
Meaning of work	.67 (3)	0.77–0.92/0.84
Role clarity	.82 (4)	0.87–0.89/0.87
Quality of leadership	.81 (4)	0.72–0.88/0.82
Sense of community	.61 (3)	0.70–0.88/0.75
Insecurity at work	.70 (4)	0.71–0.88/0.76
Job satisfaction	.84 (4)	0.73–0.88/0.84
Health problems:		
General health	.64 (3)	0.81–0.89/0.86
Mental health	.81 (4)	0.82–0.97/0.94
Musculoskeletal disorders	.71–.082 (27)	0.70–0.92/0.78

Note. COPSOQ-I = Copenhagen Psychosocial Questionnaire.

develop a Persian version of a questionnaire that estimates physical and psychosocial work-related exposures, as well as lifestyle factors and health problems among nurses.

In the adaptation process of the questionnaire our first agreement concerned the use of the expert panel method. Many previous studies rely on expert panels as an important part of the cross-cultural adaptation of a questionnaire. Due to the multifactorial dimensions of occupational health studies and the complexity of various interplaying work-related exposures, such as physical, psychosocial and organizational factors, coupled with personal and lifestyle factors, an expert panel from related professions was used. This panel consisted of two groups: one expert group in Sweden and another expert group in Iran. In fact, the main decisions of the Swedish expert panel concerned the construction of a shortened instrument while maintaining good measurement. The expert panel and its composition is the most important part of the cross-cultural adaptation of a questionnaire, because critical decisions must be made to achieve cross-cultural equivalence. The second expert panel (in Iran) reviewed all the translations and back translations, and reached a consensus on any discrepancy and equivalence between the source and the target version. As indicated in many relevant studies, the main decisions of this panel are concerned with cultural and vocabulary adaptations (Alipour et al., 2007; Beaton et al., 2000).

Table 4
Internal Consistency of Iranian Version and Chinese Version for COPSOQ-I Scales.

Scales of the COPSOQ-I	Medium-length version in Iran	Short version in China (Data from Shang et al., 2008)
	Level of alpha (no. of items)	Level of alpha (no. of items)
Quantitative demands	.74 (4)	.35 (3)
Emotional demands	.79 (3)	.70 (3)
Influence at work	.75 (4)	.76 (2)
Meaning of work	.67 (3)	–
Role clarity	.82 (4)	.88 (4)
Quality of leadership	.81 (4)	.76 (2)
Sense of community	.61 (3)	.55 (4)
Insecurity at work	.70 (4)	.74 (4)
Job satisfaction	.84 (4)	–
General health	.64 (3)	–
Mental health	.81 (4)	–
Total item	(40)	(22)

Note. COPSOQ-I = Copenhagen Psychosocial Questionnaire.

An example of cultural adaptation was that the questions about work schedule were omitted; due to the current shortage of nurses in Iran, nursing personnel are often not allowed to choose their shift order or work regular shifts; they also have to do extra work to cover the ward work schedule (Lagerstrom et al., 2010). The work situation for nurses in Iran is indeed very difficult; they have heavy workloads, extra working hours and low salaries. Thus, they run a rather high risk of health problems. Accordingly, there is a need for organizational changes such as improving physical and psychosocial working conditions in healthcare work and recruiting enough working nurses. A validated questionnaire is therefore needed in order to collect data related to the working situation and its outcomes among nurses in Iran. Another example of cultural and vocabulary adaptations of the questionnaire was the modification of some words, such as “family and close relatives” instead of “family”. In Iran the meaning of “family” differs from that in western societies, and refers to an extended family rather than a nuclear family. This means that commitment to the extended family is the social norm in Iran (O'Shea, 2003). The main finding of the pilot study based on expert comments and participants' opinions concerned the fluency and language of the questionnaire.

The test-retest reliability coefficients and internal consistency were acceptable for all items, which were consistent with the original version of the COPSOQ-I (Kristensen et al., 2005) and also with its versions in different language (Sandsjo et al., 2006; Tsutsumi, Umehara, Ono, & Kawakami, 2007). Further, results concerning levels of Cronbach's alpha for this study and the Chinese version of the COPSOQ-I (Shang et al., 2008) demonstrated similarity with regard to reliability results. This also reflected the known dependency of alpha level in number of items (Switzer et al., 1999). The COPSOQ questionnaire was developed in three versions of different lengths: long, medium, and short. Both the short and the middle version questionnaire are widely used by workplaces and work environment professionals. The medium-length version of COPSOQ had been chosen to be used in this study because it has more subscales that cover psychosocial aspects of nursing work. In addition, all subscales that have been studied in this research were not included in the short version.

The main aspect of validity, apart from content validity, is construct validity. Evidence for construct validity can be accumulated by a priori hypothesized patterns of associations with other validated instruments. In validation studies it was hypothesized a priori that there would be correlations between related constructs. In line with guidelines in the literature (Beaton et al., 2000; Salavati et al., 2008), the relationship between exposures (physical and psychosocial working conditions) and outcome was addressed in the construct validity assessment.

This study has strengths and limitations. There is increasing evidence that two prominent theoretical models, the Effort-Reward Imbalance model and the Demand-Control model, are not sufficiently comprehensive to cover most psychosocial aspects of nursing work. Our experience in this study shows the psychosocial aspects of nursing work could be reflected by using COPSOQ. Thus, future research can achieve the similar benefits by using the COPSOQ questionnaire.

One methodological consideration is related to sample size. In psychometric studies a large sample size is preferable; however, it was not feasible to recruit more participants in this study. Another methodological consideration is the way in which we dealt with missing values. With the imputation that we performed it was possible to replace missing values in accordance with the original study (Kristensen et al., 2005). Lastly, our study focus is restricted to

hospital nursing personnel. Including nursing personnel from other nursing workplace for the next studies is suggested. However, at present the majority of Iranian nurses work in hospitals.

Conclusions

The findings show that the adapted questionnaire has an acceptable conceptual structure and provides reliable information about the nursing profession. Studies of work-related exposures and outcomes, using questionnaires to assess physical and psychosocial working conditions, can provide valid information on the prevalence and severity of work-related health outcomes among nursing personnel. Thus, the questionnaire is applicable to work situation studies among nurses and other health care workers.

Conflict of interest

There are no conflicts of interest.

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